

Interactive comment on “Relative humidity impact on aerosol parameters in a Paris suburban area” by H. Randriamiarisoa et al.

Anonymous Referee #2

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The paper provides a very useful discussion of the links between aerosol chemical composition, aerosol water mass content as a function of increasing and decreasing RH, and the resulting effects on scattering and particle size. The data set is unique in that ambient conditions are used to provide conditions of increasing and decreasing RH hence there is no need to transcribe laboratory or controlled field measurements to ambient conditions. One drawback with the approach is that the aerosol chemical composition can change over the course of increasing and decreasing RH measurements hence it is difficult to attribute the observed behavior to the response of a multi-component aerosol versus a changing chemical composition. The authors mention this issue but could bring it more to the forefront of the discussion.

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p. 8095, line 24: It is stated that the CPC detects all particles with a radius between 0.05 to 1.5 μm . What is meant, then, by a 100% collection efficiency for 0.01 μm ?

p. 8096, line 12: Define occupation rates.

p. 8096, line 23: What is the uncertainty in the OC to POM factor of 1.3?

p. 8097, equation 2: This calculation of TPM assumes no water is associated with the aerosol at 30% RH. This assumption should be stated explicitly and the uncertainty of the resulting residual concentration should be reported.

p. 8097: As a test of internal consistency in the data set, can dust concentrations be estimated from the XRF measurements on the impactor samples and then compared to the residual concentrations calculated from equation 2?

p. 8099: The initial discussion of Figure 2 would be clearer if the salt mixtures (Type 1, 2, and 3) were introduced here rather than in Sect. 4.2.2.

p. 8099, line 10-11: Not more important but, rather, a factor of 4 to 10 times larger.

p. 8101: Define MDRH when first used.

p. 8101, line 20: In Figure 2, P4 and P5 indicate that the type of inorganic salt changes over the course of the increase in RH. Given that the composition of the aerosol is changing, is it valid to describe the observed behavior as the phase change due to aerosol of mixed composition such that the first increase in particle size is due to a phase change from a solid crystal to a heterogeneous droplet containing a solid core and the second increase is due to dissolution of the solid core? Is it not, instead, due to a change in chemical composition? This is mentioned on line 7 of p. 8102 but this caveat (of a change in chemical composition controlling the RH response of scattering) should be mentioned at the beginning of the discussion.

p. 8102, line 16: State in the text that the temporal variability is actually the standard deviation.

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p. 8103, line 5: It is stated that “For the periods P1 and P3, reff2 shows a weaker variability with RH \check{E} .” It is difficult to see a positive correlation between reff2 and RH for P3. In fact, they almost look anticorrelated.

p. 8104 and Figure 5: Based on the IC and XRF analysis, it is concluded that the mode close to rM2 = 0.22 μ m contains mainly soluble components while the mode close to rM2 = 3.5 μ m contains principally insoluble components. What about the organic component? Can it be ruled out that it does not have a significant contribution to the mass in either size range? (The POM content of the small mode is discussed in Section 4.1. but should also be mentioned here).

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 8091, 2005.

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